CHAPTER 14

PORTABLE OXYGEN SYSTEM P/N 1520

Section 14-1. Description

14-1. GENERAL.

14-2. The Portable Oxygen System is manufactured by Fluid Power Inc. (CAGE 99227) (figure 14-1). Table 14-1 contains the leading particulars for the portable oxygen system.

14-3. CONFIGURATION.

14-4. The Portable Oxygen System is supplied in one basic configuration that is composed of a 96 cubic inch high pressure oxygen cylinder, oxygen regulator, delivery hose, filler line and one way charging check valve assembly, with supporting unit frame and strap assembly.

14-5. FUNCTION.

14-6. Supply oxygen pressure of 2,000 psig is stored in the 96 cubic inch oxygen cylinder. When the oxygen cylinder handwheel valve is turned off, “0” pressure will be indicated on the oxygen regulator pressure gage. When the oxygen cylinder handwheel valve is turned counterclockwise to the open position, cylinder supply will be indicated on the oxygen regulator pressure gage up to 2000 psig. Steps 1 through 8 explain the operation of the oxygen regulator (figure 14-2).

1. Oxygen from the supply cylinder enters the regulator through the adapter assembly and exerts pressure against the inlet valve, permitting oxygen to flow from the oxygen inlet orifice through the inlet valve and into the pressure reducer chamber which is the area around the pressure reducer.

2. Expansion and contraction of the bellows assembly operates the pressure reducer lever which controls the inlet and reduces cylinder pressure from 1800 pounds to 49 ± 1 psig. When the chamber pressure reaches 49 ± 1 psig, the bellows contracts, causing the pressure reducer lever to push the inlet valve up against the oxygen inlet orifice and shut off the flow of oxygen.

Table 14-1. Leading Particulars

Part Number	1520
Federal Stock Number (FSN)	RH1660-650-1711-Y120
Operating Altitude Range:	
Air-Oxygen Mixture	Up to 32,000 ft
100 Percent Oxygen	Over 32,000 ft
Visual Indications	High pressure oxygen gage and oxygen flow indicator
Regulator Controls:	
Diluter Lever	To select NORMAL OXYGEN or 100% OXYGEN
Cylinder Valve	Opens and closes oxygen supply
Emergency Valve	For emergency use
Overall Dimensions:	
Weight (Approximate)	11.3 pounds
Height (Overall)	16 3/4 inches
Width (Overall)	6 5/8 inches

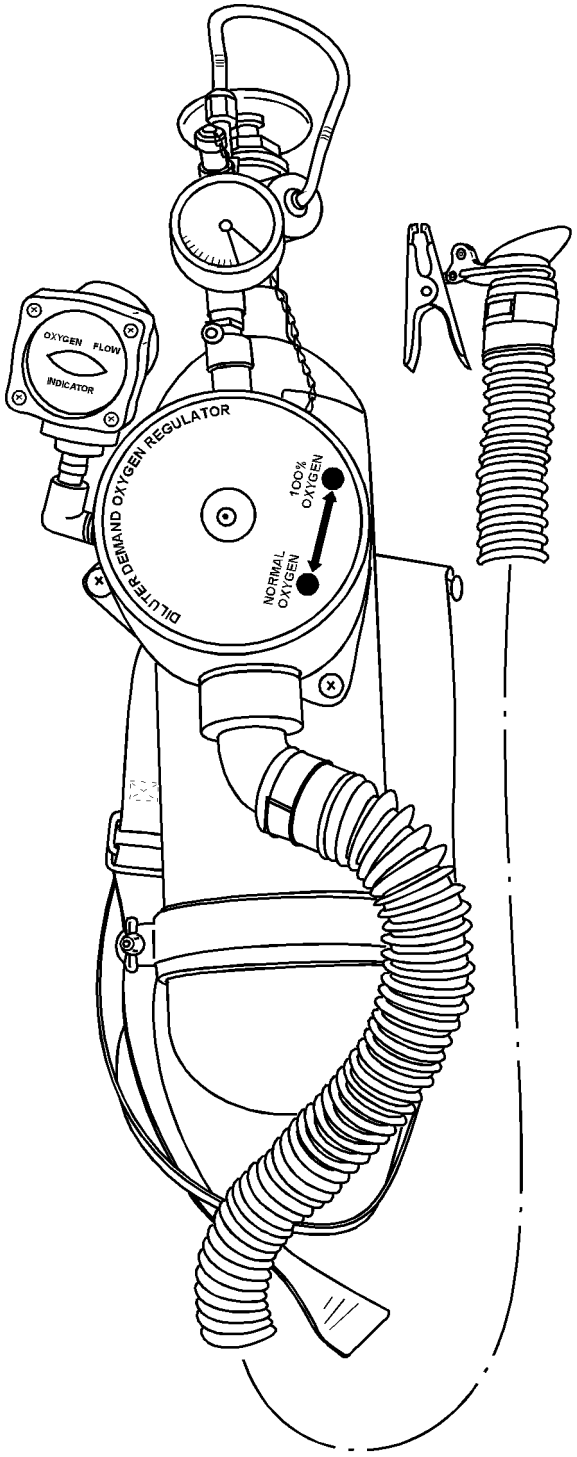


Figure 14-1. Portable Oxygen System

3. Relief valve assembly covers the top of the pressure reducer chamber. It acts as a safety valve to prevent excessive pressure from building up within, if a malfunction should occur in the pressure reducer assembly. When pressure in the reducer chamber reaches 65 to 160 psig, the valve seat unseats and relieves excessive pressure.

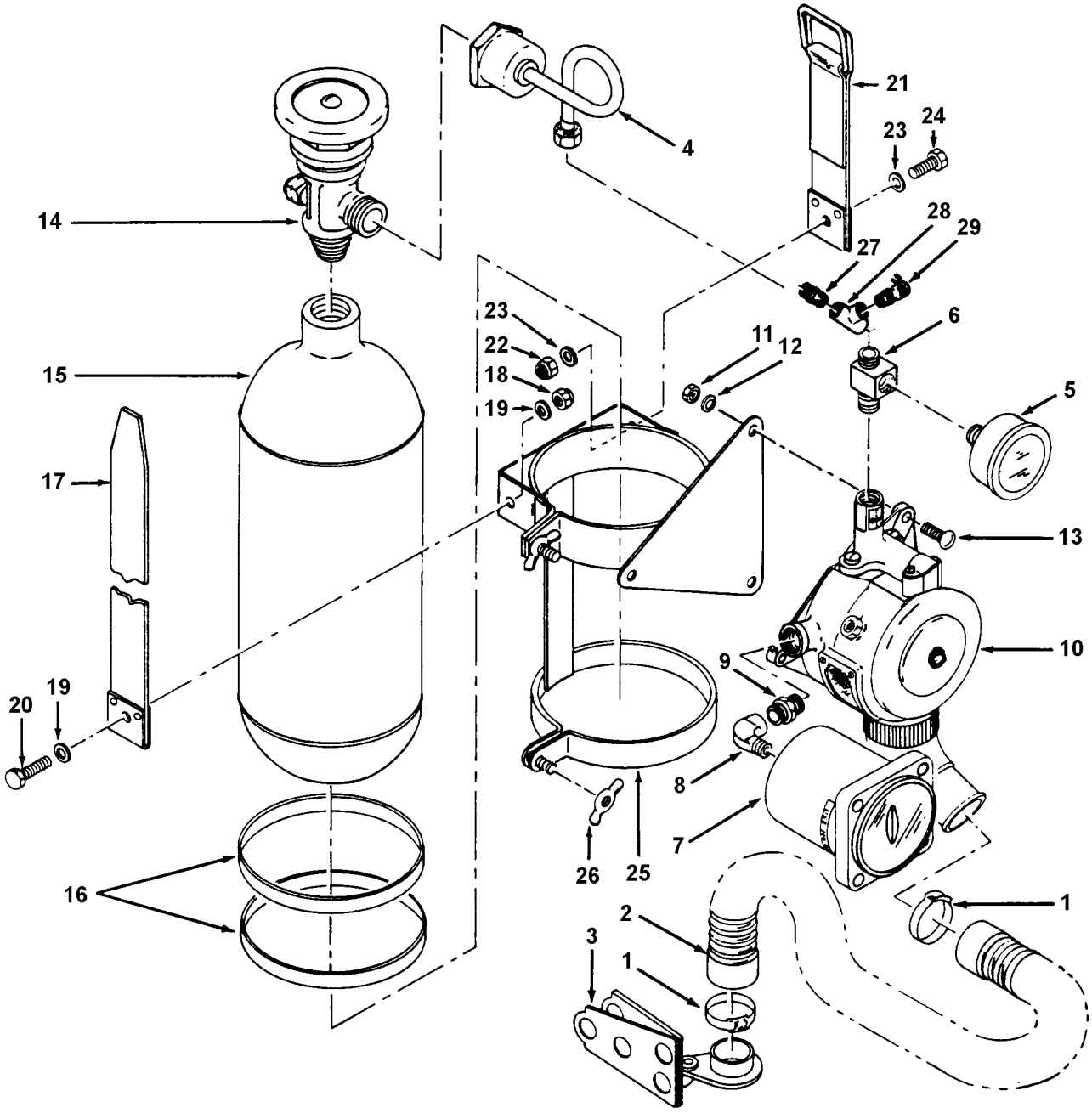
4. Oxygen flows from the pressure reducer chamber into the lower half of the demand valve chamber. The demand valve is controlled by diaphragm which, in turn, is controlled by the person using the regulator. The center of the diaphragm is attached to the diaphragm lever by means of diaphragm knob and diaphragm link. When the individual inhales, the diaphragm moves toward the demand valve which in turn causes the diaphragm lever to drop. When the diaphragm lever drops, pressure is exerted on the demand valve stem which, in turn, opens the demand valve permitting oxygen to enter the upper half of the demand valve chamber. Oxygen then passes through the hole in the upper part of the demand valve chamber and into the injector assembly. When the user exhales, the diaphragm moves away from the demand valve, thus raising the diaphragm lever and releasing pressure on the demand valve stem, thereby closing the demand valve.

NOTE

If desired, either to check the operation of the regulator or to quickly obtain a continuous oxygen flow, the diaphragm knob can be depressed by hand. This position will keep the demand valve open as long as the knob is depressed.

5. When air valve lever (N) is turned counterclockwise, the air valve cover and air valve body separate slightly, exposing two screen inlets, at the air valve entrance. Inside air valve is an aneroid assembly which is sensitive to changes in atmospheric pressure. At sea level the aneroid contracts, permitting air to pass around the aneroid, unseat the air check valve disc and enter the chamber when there is sufficient suction buildup caused by inhalation. As higher altitudes are reached, decreasing atmospheric pressure allows the aneroid to expand, gradually forcing the throttling plate against the valve seat and eventually shutting off the outside air flow into the chamber. This action occurs between 28,000 and 32,000 feet. Air admitted to the air chamber flows into the injector assembly. Should the user desire 100% oxygen prior to the aneroid expanding and cutting off outside air, turn the air valve lever clockwise and this action will shut off all outside air.

6. The air check valve, which closes when the regulator user exhales, is part of the check valve and aneroid assembly. This assembly prevents the escape of oxygen. It also prevents any flow of air until a definite suction is built up so the air-oxygen mixture will be the correct ratio for low flows.



1. HOSE CLAMPS
2. TUBE
3. CONNECTOR ASSY
4. LINE ASSY
5. GAUGE
6. FITTING
7. OXYGEN FLOW INDICATOR
8. ELBOW
9. NIPPLE
10. OXYGEN REGULATOR
11. NUT
12. WASHER
13. SCREW
14. VALVE
15. OXYGEN CYLINDER
16. CYLINDER BAND
17. STRAP ASSY
18. NUT
19. WASHER
20. SCREW
21. STRAP ASSY
22. NUT
23. WASHER
24. SCREW
25. SUPPORT BRACKET ASSY
26. NUT
27. NIPPLE
28. TEE
29. CHARGING CHECK VALVE ASSY

014002

Figure 14-2. Portable Oxygen System, Exploded View

7. Oxygen from the demand valve flows into the injector assembly. As it leaves the injector nozzle, the air from the air valve mixes with it. Upon inhalation, of the mixture of air and oxygen is drawn through the venturi. The venturi delivers an air-oxygen mixture through the elbow assembly to the oxygen mask.

8. The injector assembly is adapted to handle large quantities of oxygen under unusual conditions. The nozzle in the injector housing forms a valve with the injector seat. For high flows the nozzle unseats itself and releases a greater quantity of oxygen through the holes in the lower portion of the injector housing.

14-7. SERVICE LIFE.

14-8. The Portable Oxygen System regulator shall remain in service as long as repair cost does not exceed 75% of the cost of the regulator. The 96 cubic inch oxygen cylinder falls under the Department of Transportation (D.O.T.) regulation and must be removed from service every 5 years for hydrostatic testing. The D.O.T. number (example: ICC 3AA) and the latest hydrostatic test date (example: 12/98) will be permanently stamped in the neck of the cylinder.

14-9. REFERENCE NUMBERS, ITEMS, AND SUPPLY DATA.

14-10. Section 14-4, Illustrated Parts Breakdown, contains information on each assembly, subassembly and component part of the Portable Oxygen System. The figure and index number, reference or part number, description and units per assembly are provided with the breakdown.

Section 14-2. Modifications

14-11. GENERAL.

14-12. No modifications to the Portable Oxygen System are required or authorized at this time.

Section 14-3. Maintenance

14-13. GENERAL.

14-14. This section contains procedural steps for inspection, testing, disassembly, cleaning, repair and assembly of the Portable Oxygen System.

14-15. Procedural steps outlined in this section are listed as they are required, and in the sequence in which they occur.

NOTE

The Portable Oxygen System shall be considered beyond economical repair when cost of repair parts exceeds 75% of the cost of the Portable Oxygen System.

Upon completion of any maintenance action (e.g. inspection, repair, modification, etc.), be sure to make necessary entries on appropriate forms in accordance with OPNAVINST 4790.2 Series.

14-16. INSPECTION.

14-17. SPECIAL INSPECTION. The Special Inspection consists of a visual inspection (paragraph 14-19) and functional test (paragraph 14-21) of the Portable Oxygen System. The Special Inspection is performed in conjunction with the aircraft inspection requirements for the aircraft in which the Portable Oxygen System is installed.

14-18. CALENDAR INSPECTION. The Calendar Inspection shall be conducted on the Portable Oxygen System every 448 days. The Calendar Inspection consists of the following:

1. Disassembly (paragraph 14-27).
2. Cleaning (paragraph 14-29).
3. Repair (paragraph 14-31).
4. Bench Test of Oxygen Regulator (paragraph 14-22).
5. Visual Inspection (paragraph 14-19).

6. Assembly (paragraph 14-34).

7. Charging Oxygen Cylinder (paragraph 14-25).

8. Functional Test (paragraph 14-21).

14-19. VISUAL INSPECTION. To perform the Visual Inspection, proceed as follows:

NOTE

To assist in keeping track of the 96 cubic inch oxygen cylinders that are coming due for hydrostatic testing, it is highly recommended that local serial numbers be assigned and stenciled on the main body of the cylinder. Keep records of that cylinder using local assigned serial numbers, aircraft BUNO installed on and hydrostatic test date due.

Index numbers refer to figure 14-2 unless otherwise noted.

1. Inspect oxygen regulator legibility of all markings, for good condition and security of attachment.

2. Inspect support bracket (28) for cracks, dents, and security of attachment.

3. Inspect oxygen hose assembly (3) for cut, tears, fraying, dry rot of rubber and security of clamps (2) and oxygen connector (4).

4. Inspect short strap assembly (24) and long strap assembly (20) for cuts, tears, fraying, good condition and security of attachment machine bolts (23 and 27), washers (22 and 26) and nuts (21 and 25).

5. Inspect cylinder valve assembly (15) for good condition.

6. Inspect oxygen cylinder (17) condition and in service hydrostatic test date stamped in neck of cylinder.

7. Inspect charging check valve assembly (32) for good condition and security of attachment.

8. Inspect tee (31) for cracks and good condition.

9. Inspect nipple (30), and line (5) for good condition and security of attachment.

10. Replace all defective parts.

14-20. TESTING.

14-21. FUNCTIONAL TEST. To perform the functional test on the Portable Oxygen System, proceed as follows:

NOTE

Index numbers refer to figure 14-2 unless otherwise noted.

1. Ensure oxygen regulator (11) diluter knob is in the 100% position.

2. Turn oxygen cylinder valve assembly (15) to the full open position. Oxygen regulator (11) pressure gage should indicate between 1800 to 2000 psig. There should be no flow out of oxygen connector (4).

3. Slightly depress the diaphragm knob (located on top center) of oxygen regulator (11). There should be a flow out of oxygen connector (4).

4. Release the diaphragm knob. There should be no flow out of oxygen connector (4).

5. Turn oxygen cylinder valve assembly (15) to full off position.

6. Depress diaphragm knob to deplete pressure from oxygen regulator (11), then release oxygen regulator (11) diaphragm knob.

7. If portable oxygen system fails functional test, replace with RFI unit.

8. Charge or top off portable oxygen system in accordance with paragraph 14-25, as necessary.

14-22. BENCH TEST OXYGEN REGULATOR. Forward oxygen regulator to AIMD or MALS for bench test in accordance with NAVAIR 13-1-6.4-2.

14-23. STORAGE.

14-24. STORAGE OF PORTABLE OXYGEN SYSTEM ABOARD THE AIRCRAFT. Figure 14-3 shows typical storage aboard the aircraft.

14-25. CHARGING.

14-26. To charge the Portable Oxygen System, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Oxygen, Aviator's Breathing	MIL-O-27210, Type 1

014003

Figure 14-3. Typical Storage of Portable Oxygen System on Aircraft

NOTE

Personnel operating oxygen recharge spin cart should be thoroughly familiar with all valves and controls. Prior to operating, refer to appropriate ground support equipment manual and servicing placard on spin cart for recharging operation procedures. Personnel operating oxygen spin cart shall be licensed in accordance with OPNAVINST 4790.2 Series.

Index numbers refer to figure 14-2 unless otherwise noted.

1. Disconnect dust cap from charging check valve assembly (32).

2. Connect servicing line from oxygen spin cart.

3. Turn cylinder valve assembly (15) to full open position.

NOTE

During filling operation, Portable Oxygen System servicing pressure will be indicated on oxygen regulator (11) pressure gage.

4. Using oxygen spin cart, fill the Portable Oxygen System to 1800 to 2000 psig in stages outlined in table 14-2. Fill time for each stage is a minimum of 3 minutes with a 2 minute cool down period.

5. Shut down and secure oxygen spin cart.

6. Turn Portable Oxygen System cylinder valve assembly (15) to full off position.

7. Depress oxygen regulator (11) diaphragm knob to bleed pressure from Portable Oxygen System.

8. Disconnect oxygen spin cart servicing line from Portable Oxygen System charging check valve assembly (32).

9. Install dust cap on to Portable Oxygen System charging check valve assembly (32).

14-27. DISASSEMBLY.

14-28. To disassemble the Portable Oxygen System, proceed as follows:

WARNING

Prior to disassembly, ensure oxygen cylinder valve (15) is in fully closed position. Depress oxygen regulator (11) diaphragm knob to bleed pressure from system, then release oxygen regulator (11) diaphragm knob.

NOTE

Index numbers refer to figure 14-5 unless otherwise noted.

Disassemble the Portable Oxygen System only as far as necessary to perform a repair action or a specific maintenance function.

1. Remove cap and chain from charging check valve assembly (32) and remove charging check valve assembly (32) from tee (31).

Table 14-2. Cylinder Filling Stages

STAGE	PSIG
1	0-500
2	500-1000
3	1000-1500
4	1500-1800
5	1800-2000

AMBIENT AIR TEMPERATURE		CHARGING PRESSURE
°F	°C	PSIG
0	-18	1550-1750
10	-12	1600-1775
20	-7	1625-1800
30	-1	1675-1850
40	5	1700-1875
50	10	1725-1925
60	16	1775-1975
70	21	1800-2000
80	27	1825-2050
90	32	1875-2075
100	38	1900-2125
110	43	1925-2150
120	49	1975-2200
130	54	2000-2225

2. Disconnect line assembly (5) from cylinder valve assembly (15).

3. Disconnect line assembly (5) from nipple (30).

4. Remove nipple (30) and tee (31) from gauge fitting (7).

5. Remove oxygen regulator assembly (11) from support bracket assembly (28) by removing three screws (14), washers (13), and nuts (12).

6. Remove hose assembly (3) from oxygen regulator assembly (11) outlet by loosening clamp (2).

7. Remove oxygen cylinder (17) and oxygen valve (16) as unit from support bracket assembly (28), by removing two wing nuts (29).

8. Remove long strap assembly (20) from support bracket assembly (28) by removing screw (23), two washer (22), and nut (21).

9. Remove short strap assembly (24) by removing screw (27), two washers (26), and nut (25).

10. Forward oxygen regulator assembly (11) to AIMD or MALS for bench test and repair.

14-29. CLEANING.

14-30. To clean the Portable Oxygen System parts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Dishwashing Liquid, Ivory Liquid or Equivalent	Local Purchase
As Required	Cloth, Lint-Free	MIL-C-85043

NOTE

Do not clean oxygen cylinder (17) using NOC process. Clean external body of oxygen cylinder (17) in accordance with the procedure outlined in step 3 of this paragraph.

1. Clean oxygen line (5) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

2. Clean all metal parts (with exception of oxygen cylinder assembly (17)) in accordance with procedures outlined in NAVAIR 13-1-6.4-1.

3. Clean external body of oxygen cylinder assembly (17) by mixing 1 part Ivory liquid (or equivalent) to 5 parts water and wiping clean with a lint-free cloth. Wipe dry cylinder with a lint-free cloth.

14-31. REPAIR.

14-32. Repair of the Portable Oxygen System is limited to the fabrication of short strap (24) and long strap (20). All other defective components shall be replaced with new components. To fabricate new short strap (24) or long strap (20), proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Webbing, Nylon, 1 inch, Type XVII	MIL-W-4088 NIIN 00-260-6906
2	Ring, Metallic	MIL-R-3390 NIIN 00-202-0228
2	Grommet, Metallic Spur, Size O	NIIN 00-231-6582
As Required	Thread, Nylon, Size E	V-T-295 NIIN 00-616-0079

1. Fabricate short strap assembly (24) as per Figure 14-4, view B.

2. Fabricate long strap assembly (20) as per Figure 14-4, view A.

14-33. VISUAL INSPECTION. Perform Visual Inspection of disassembled parts in accordance with paragraph 14-19.

14-34. ASSEMBLY.

14-35. To assemble the portable oxygen system, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Leak, Detection, Compound, Type 1	MIL-L-25567
As Required	Tape, Anti-seize	MIL-T-27730A

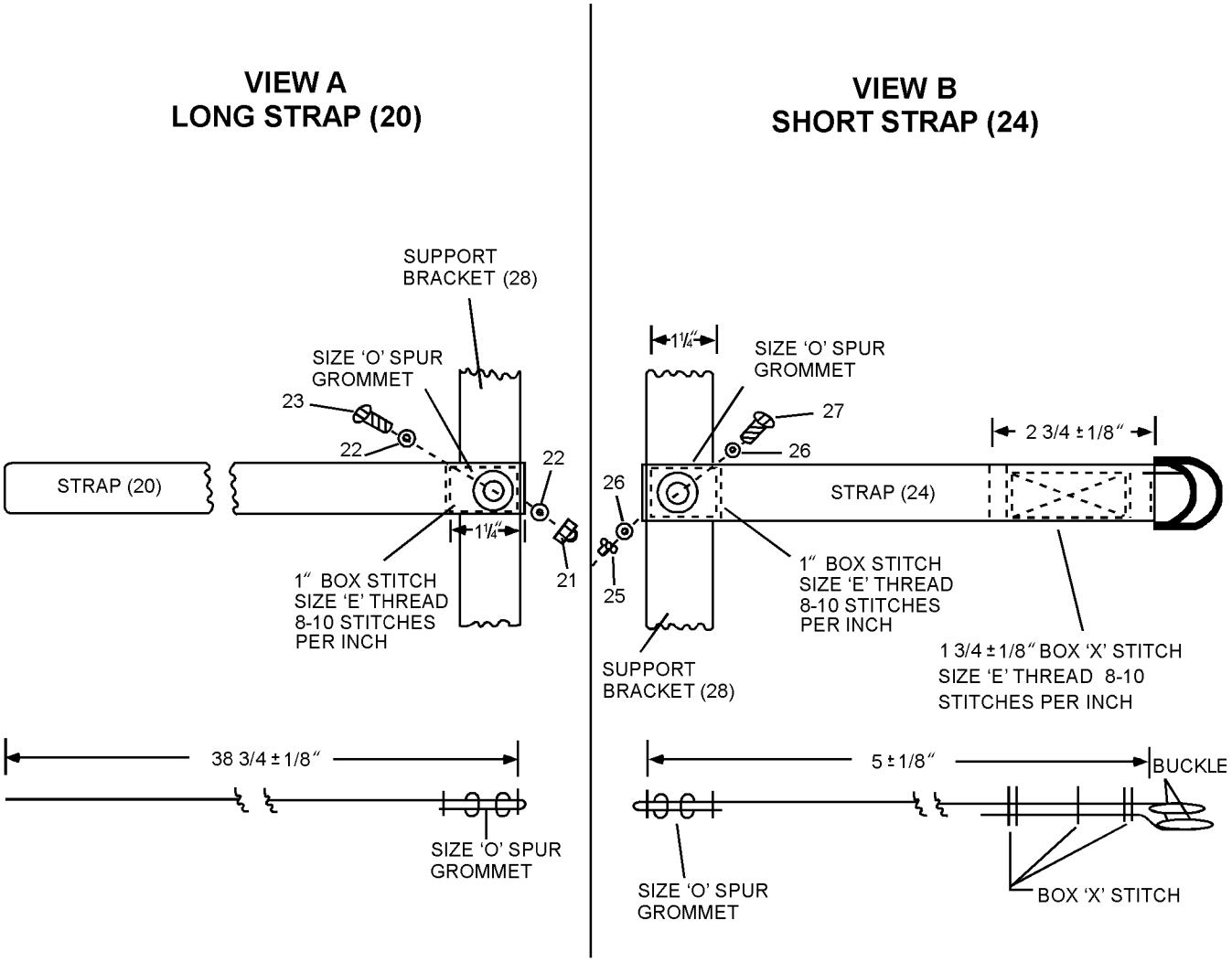


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Figure 14-4. Short and Long Strap

NOTE

Index numbers refer to figure 14-5 unless otherwise noted.

1. Attach long strap assembly (20) to support bracket assembly (28) and secure with screw (23), two washers (22) and nut (21).

2. Attach short strap assembly (24) to support bracket assembly (28) and secure with screw (27), two washers (26) and nut (25).

3. Apply anti-seize tape to pipe threads gauge fitting (7), nipple (30) and charging check valve assembly (32).

4. Install one end of nipple (30) into tee (31) hand tight, then using a wrench tighten an additional one to two turns maximum.

5. Install nipple (30) and tee (31) onto gauge fitting (7) hand tight, then using a wrench tighten an additional one to two turns maximum.

6. Install charging check valve assembly (32) into tee (31) hand tight, then using a wrench tighten an additional one to two turns maximum. Install dust cap and chain on valve assembly (32).

7. Loosely attach line assembly (5) to nipple (30).

8. Attach oxygen regulator (11) with pressure facing up and outlet facing down to support bracket assembly (28) and secure with three screws (14), washers (13) and nuts (12).

9. Install two cylinder bands (18) onto oxygen cylinder (17).

10. Install oxygen cylinder (17) and oxygen valve assembly (15) into support bracket assembly (28) ensuring two cylinder bands are aligned support bracket (28) clamps and loosely secure with two wing nuts (29). Align oxygen valve assembly (15) with line assembly (5) and connect line assembly (5) to oxygen valve assembly (15). Tighten two wing nuts (29).

11. Tighten line assembly (5) at nipple (30) connection and oxygen valve assembly (15) connection.

12. Place clamp (2) onto hose assembly (3) and attach hose assembly (3) to oxygen regulator (11) outlet and secure with clamp (2).

13. If removed, place clamp (2) onto hose assembly (3), install oxygen connector assembly (4) into hose assembly (3) and secure with clamp (2).

14-36. POST ASSEMBLY TESTING. To perform Post Assembly Testing, proceed as follows:

1. Charge Portable Oxygen System in accordance with paragraph 14-25.

NOTE

When performing step 2, with Portable Oxygen System pressurized, using leak detection compound check for leakage at line assembly (5) connections and at tee (31) connections.

2. Perform functional test in accordance with paragraph 14-21.

Section 14-4. Illustrated Parts Breakdown

14-37. GENERAL.

14-38. This section lists and illustrates the assemblies and detail parts of the Portable Oxygen System manufactured by Fluid Power Inc. (CAGE 99227) Part No. 1520.

14-39. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

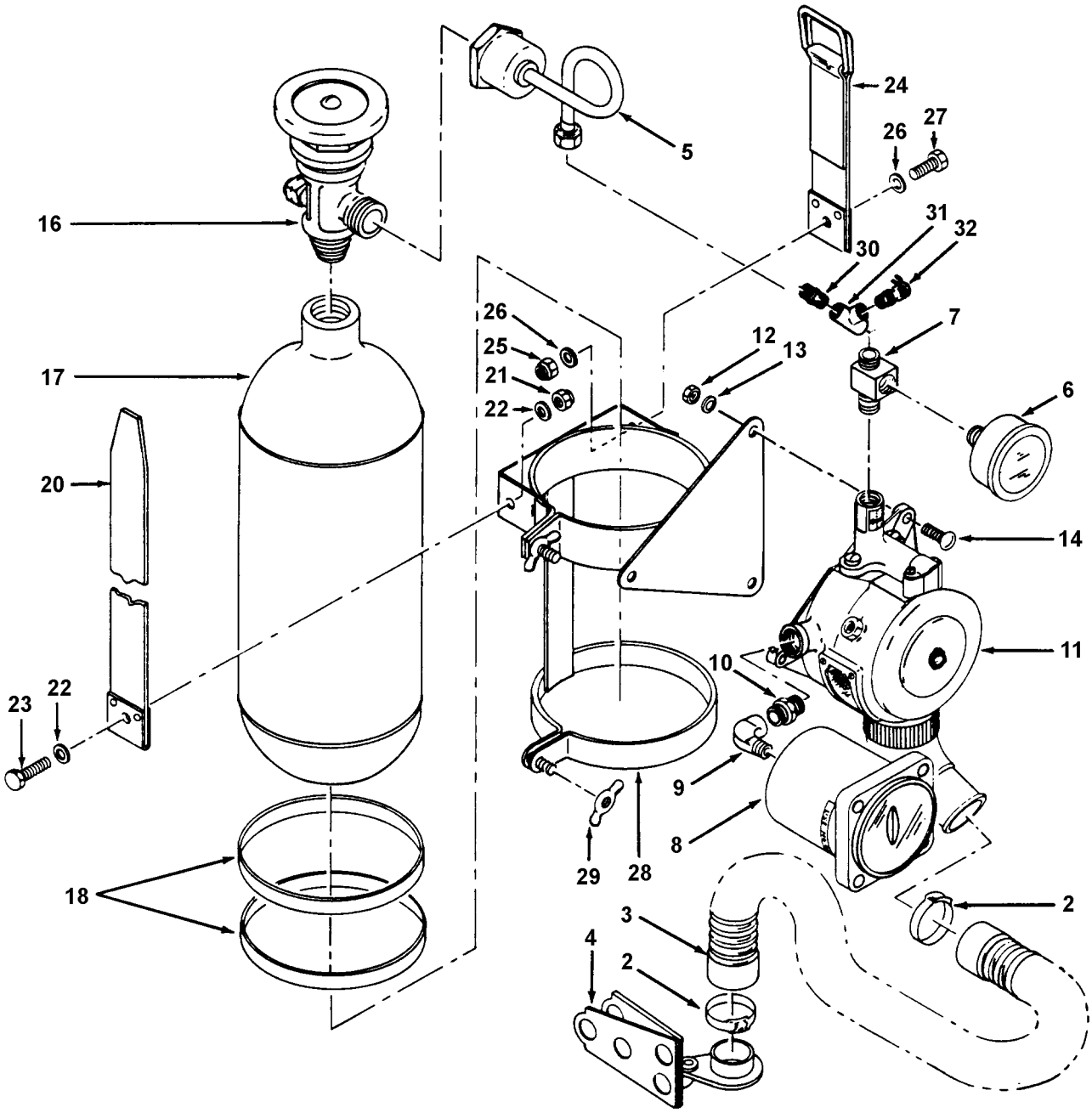

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Figure 14-5. Portable Oxygen System

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
14-5	1520	DILUTER DEMAND UNIT (Note 1)	1	
-1	2495	. TUBE ASSEMBLY	1	
-2	A20728-18-1	. . CLAMP, Hose (78553) (Fluid Power Part No. 1382)	2	
-3	AN6003T36A	. . TUBE (Fluid Power Part No. 1386)	1	
-4	1385	. . CONNECTOR ASSEMBLY	1	
-5	1353	. LINE ASSEMBLY	1	
-6	2620	. GAUGE	1	
-7	1631	. FITTING, Gauge	1	
-8	1775	. INDICATOR, Oxygen flow	1	
-9	AN914-1	. ELBOW	1	
-10	AN911-1	. NIPPLE	1	
-11	1600	. REGULATOR, Oxygen, type A-12A (Note 2)	1	
	2858-A1	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-A1A	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-B1	. REGULATOR, Oxygen (99251) (Note 2)	1	
	2858-C1	. REGULATOR, Oxygen (99251) (Note 2)	1	
		(ATTACHING PARTS)		
-12	AN315D3R	. NUT	3	
-13	AN935B10L	. WASHER	3	
-14	AN520DD10-8	. SCREW	3	
		---*---		
-15	1390	. CYLINDER AND VALVE ASSEMBLY	1	
-16	1361	. . VALVE, Oxygen cylinder	1	
-17	MS26545-A1X0096 MS26545-A2X0096	. . CYLINDER, Oxygen (Fluid Power Part No. 1395)	1	
-18	2733	. BAND, Cylinder	2	
-19	1525	. SUPPORT ASSEMBLY	1	
-20	1555	. . STRAP ASSEMBLY, Long	1	
		(ATTACHING PARTS)		
-21	AN365-1032	. . NUT	1	
-22	AN960-10	. . WASHER	2	
-23	AN3-4	. . SCREW	1	
		---*---		
-24	1515	. . STRAP ASSEMBLY, Short	1	
		(ATTACHING PARTS)		
-25	AN365-1032	. . NUT	1	
-26	AN960-10	. . WASHER	2	
-27	AN3-4	. . SCREW	1	
		---*---		
-28	1565	. . SUPPORT BRACKET ASSEMBLY	1	
-29	AN350-1032	. . NUT	2	
-30	AN911-1	. . NIPPLE, Pipe Thread (88044)	1	
-31	AN917-1	. . TEE, Internal Pipe thread (88044)	1	
-32	4215	. . CHECK VALVE ASSEMBLY, ...	1	
		Charging (00-964-3294)		

Figure and Index Number	Part Number	Description 1 2 3 4 5 6 7	Units Per Assembly	Usable On Code
Notes: 1. Most parts listed in IPB may not be stocked in supply system. For these parts, activities must order the parts open purchase from the following company: Fluid Power Inc. 1300 Hudson Gate Dr. P. O. Box 208 Hudson, Ohio 44236 TEL: (330) 653-5107 2. See NAVAIR 13-1-6.4-2 for IPB.				

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
B40832-1	13-6-1	PAGZZ
AN3-4	14-5-23	PAOZZ
	14-5-27	PAOZZ
AN315D3R	14-5-12	PAOZZ
AN350-1032	14-5-29	PAOZZ
AN365-1032	14-5-21	PAOZZ
	14-5-25	PAOZZ
AN520DD10-8	14-5-14	PAOZZ
AN6003T36A	14-5-3	PAOZZ
AN911-1	14-5-10	PAOGG
	14-5-30	PAOZZ
AN914-1	14-5-9	PAOZZ
AN917-1	14-5-31	PAOZZ
AN935B10L	14-5-13	PAOZZ
AN960-10	14-5-22	PAOZZ
	14-5-26	PAOZZ
A20728-18-1	14-5-2	PAOZZ
MS26545-A1X-0096	14-5-17	PAODD
MS26545-A2X-0096	14-5-17	PAODD
1353	14-5-5	PAOZZ
1361	14-5-16	PAODD
1385	14-5-4	PAOZZ
1390	14-5-15	PAODD
1515	14-5-24	MFOZZ
1520	14-5	PAOGG
1525	14-5-19	PAOGG
1555	14-5-20	MFOZZ
1565	14-5-28	PAOGG
1600	14-5-11	PAOGG
1631	14-5-7	PAGZZ
1775	14-5-8	PAGZZ
2495	14-5-1	PAOZZ
2620	14-5-6	PAGZZ
2733	14-5-18	PAOZZ
2858-A1	14-5-11	PAOGG
2858-A1A	14-5-11	PAOGG
2858-B1	14-5-11	PAOGG
2858-C1	14-5-11	PAOGG
4215	14-5-31	